CHRISTIE
AUTOMOTIVE PRODUCTS

Wheel Charger Owner's Manual

Includes information on Christie Model Nos. QWC and FDC

⚠WARNING

Failure to follow instructions may cause damage or explosion, always shield eyes. **Read entire instruction manual before use.**

Warning: This product contains chemicals, including lead, known to the State of California to cause cancer, birth defects and other reproductive harm. Wash hands after handling.

Congratulations on the purchase of your new battery charger. We wish to acknowledge Underwriters Laboratories (U/L) for contributing the following important safety precautions. Please read and retain these instructions for the continued safe use of your new charger.

This manual contains important safety information. **DO NOT OPERATE** this equipment **UNTIL YOU HAVE READ** this safety summary!

SAFETY SUMMARY

IMPORTANT SAFETY INSTRUCTIONS
SAVE THESE INSTRUCTIONS

⚠WARNING	
	Read these instructions completely before using the Battery Charger and save them for future reference. Before using the Battery Charger to charge a battery, read these instructions and the instruction manual/safety information provided by the car, truck, boat or equipment manufacturer. Following all manufacturers' instructions and safety procedures will reduce the risk of accident.
	Working around lead-acid batteries may be dangerous. Lead-acid batteries release explosive gases during normal operation, charging and jump starting. Carefully read and follow these instructions for safe use. Always follow the specific instructions in this manual and on the Battery Charger each time you use the Battery Charger. All lead-acid batteries (car, truck and boat) produce hydrogen gas which may violently explode in the presence of fire or sparks. **Do not smoke, use matches or a cigarette lighter while near batteries.** Do not handle the battery while wearing vinyl clothing because static electricity sparks are generated when vinyl clothing is rubbed. Review all cautionary material on the Battery Charger and in the engine compartment.
	Always wear eye protection, appropriate protective clothing and other safety equipment when working near lead-acid batteries. Do not touch eyes while working on or around lead-acid batteries.
	Always store clamps away from each other or common conductors. Improper storage of clamps may cause the clamps to come in contact with each other, or a common conductor, which would be hazardous if the charger was plugged into an AC outlet.
	Use extreme care while working within the engine compartment, because moving parts may cause severe injury. Read and follow all safety instructions published in the vehicle's Owner's Manual.
	Batteries being charged with the Battery Charger unit likely contain liquid acids which are hazardous if spilled.

WARNING: This product contains chemicals, including lead, known to the State of California to cause cancer, birth defects and other reproductive harm. Wash hands after handling.

⚠ WARNING – Shock Hazards

1. **NEVER** store the charger outdoors - always store indoors when not in use.
2. When charger is used outdoors, extreme care must be taken to ensure that any electrical connections, such as extension cords are properly shielded from exposure to rain, snow and moisture.
3. **NEVER** attempt to charge a marine (boat) battery while the boat is on or near the water. A boat must be on a trailer and located indoors before attempting to charge its battery(s). The boat manufacturer's battery charging instructions must be followed exactly.
4. **NEVER** set the charger, output cable or clamps, or ac power cord plug in water or on wet surfaces.
5. **NEVER** use this charger on a pier or dock. Charger could fall in water, creating an electric shock hazard.
6 **NEVER** attempt to plug in or operate the battery charger with defective or damaged wires, power cord, or power cord plug. Have any of these parts that are defective or damaged replaced by qualified personnel IMMEDIATELY.
7 **NEVER** attempt to plug in the charger or operate its controls with wet hands or while standing in water.
8. **NEVER** alter the ac power cord or power cord plug provided with the battery charger.
9 **NEVER** use an attachment not recommended or sold by Clore Automotive for use with this specific model battery charger. Use of such attachment may result in risk of fire, electric shock or injury to persons.
10 **NEVER** operate this battery charger if it has received a sharp blow, been dropped, or similarly damaged, until after being inspected and/or repaired by qualified service personnel.
11. **NEVER** disassemble this battery charger. Take the battery charger to qualified service personnel when service or repair is needed.
12. **ALWAYS** plug in and unplug the ac power cord by grasping the power cord plug, **NOT THE POWER CORD**, to reduce risk of damaging power cord.
13. **ALWAYS** unplug the battery charger from the ac outlet before attempting any cleaning or maintenance. Turning the charger's control(s) OFF, alone, will not remove all electricity from the charger.
14. An extension cord should not be used unless absolutely necessary. Use of an improper extension cord could result in a fire or electric shock. If an extension cord must be used, make sure that:
    a. That pins on plug of extension cord are the same number, size, and shape as those of plug on charger,
    b. That extension cord is properly wired and in good electrical condition; and
    c. That the wire size is large enough for the length of cord as specified below:

Length of cord in feet:	25	50	100	150
AWG size of cord:	16	12	10	8

⚠ WARNING – Risk of Explosive Gases

1. Working in the vicinity of a lead-acid battery is dangerous. Batteries generate explosive gasses during normal operations and, at an even higher level, during charging. If anything is allowed to ignite these gasses, the battery may explode, sending pieces of the battery and extremely caustic battery acid out in all directions and with extreme force. Since just the slightest spark is sufficient to ignite these gasses, it is of **UTMOST IMPORTANCE** that you read this manual and follow the instructions exactly before using your battery charger.
2. To reduce the risk of battery explosion, follow these instructions and those published by battery manufacturer and manufacturer of any equipment you intend to use in vicinity of battery. Review cautionary markings on these products and on engine.
3. **NEVER** operate this battery charger near any fuel tanks or gas cylinders. This charger can produce sparks that could ignite gasses and cause an explosion.
4 **NEVER** attempt to permanently mount this battery charger on a marine or recreational vehicle.
5 **NEVER** attempt to connect this charger's output cables directly to the battery(s) in the bilge or engine compartment of a boat. Follow the boat manufacturer's battery charging instructions exactly.

⚠ WARNING – Battery Explosion Hazards

1. **NEVER** connect both battery charger clamps directly to the two posts of the same battery. See Operation Instructions for connection procedures.
2. **NEVER** allow the DC output clamps to touch each other.
3. **ALWAYS** be extra cautious to reduce the risk of dropping a metal object, such as a tool, onto or near the battery. Doing so could produce a spark or short circuit the battery or other electrical part that could cause an explosion.
4. **NEVER** operate the battery charger in a closed-in area or restrict ventilation in any way.
5. **ALWAYS** make sure the area around a battery is well ventilated while it is being charged. Gas can be forcefully blown away by using a piece of cardboard or other non-metallic material as a fan.
6. ALWAYS make sure that the ac power cord is unplugged from the ac outlet or extension cord **BEFORE** connecting or disconnecting the battery charger clamps, to prevent arcing or burning.
7. **ALWAYS** locate the battery charger as far away from the battery as the DC output cables will permit.
8. **ALWAYS** twist or rock charger clamps back and forth several times on the battery post and the other point of connection at the time of initial connection. This helps keep the clamps from slipping off their points of connection which helps reduce the risk of sparking. **DO NOT** rock the clamp connected to the battery post **AFTER** the second connection (at a point away from the battery) is made or sparking may occur at the battery post.
9. **ALWAYS** check the cable and wire connections at the battery(s) for tightness **BEFORE** starting to charge. A loose connection can cause sparks or excessive heating which could cause a battery explosion.
10. **ALWAYS** make sure the battery compartment is open and well ventilated before charging.

⚠ WARNING – Moving Parts Hazards

1. **NEVER** connect the battery charger clamps to a vehicle when the engine is running.
2. **ALWAYS** stay clear of fan blades, fan belts, pulleys and other moving engine parts when working near an engine. Moving engine parts can cause severe personal injury, including dismemberment.
3. **ALWAYS** make sure that the battery charger cables and clamps are positioned so they will not come in contact with any moving engine parts.
4. **NEVER** wear loose clothing or long hair around moving parts because they may get caught and cause severe injury or death.

⚠ WARNING – Burn Hazards

1. **NEVER** lean on or rest against the engine or cooling system parts when the vehicle is running.
2. **ALWAYS** stay clear of the cooling system, engine, and engine manifold. These engine components get very hot and retain heat for a long time. Touching any of these components can cause severe burns.

PERSONAL PRECAUTIONS

1. Someone should be within range of your voice or close enough to come to your aid when you work near a lead-acid battery.
2. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
3. Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.
4. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least 10 minutes and get medical attention immediately.
5. **NEVER** smoke or allow a spark or flame in vicinity of battery or engine.
6. Be extra cautious to reduce risk of dropping a metal tool onto battery. It might spark or short-circuit battery or other electrical part that may cause explosion.
7. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery. A lead-acid battery can produce a short-circuit current high enough to weld a ring or other jewelry to metal, causing a severe burn.
8. Use charger for charging **LEAD-ACID** batteries only. It is not intended to supply power to a low voltage electrical system other than in a starter-motor application. Do not use battery charger for charging dry-cell batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage to property.
9. **NEVER** charge a frozen battery, as battery explosion can result.

TABLE OF CONTENTS

Safety Summary

Safety Information 2
- Shock Hazards 3
- Explosive Gas Hazards 3
- Battery Explosion 4
- Moving Parts Hazards 4
- Burn Hazards 4
- Personal Precautions 5

Introduction

Description 8

How Batteries Charge 8

Deeply-discharged Lead-Calcium Batteries 8

Spark Prevention 8

Assembly

Assembly 9

Preparation

Charger Placement 10

Provide Required Power 10
- Extension Cords 10

Battery Preparation 11

Controls and Indicators

Control Setting Instructions 12
- Charge Voltage and Rate Selection 12
- Charging Rate Settings by Model 12
- Charging Indicator LED 12
- Timer Switch Setting 13
- Polarity Proctection Switch 13
- Pre-Charge Battery Activation 13

Operation

Operating Instructions 14
Connecting to Batteries Installed in Vehicles 14
Connecting to Batteries Outside a Vehicle 14
Charging Instructions 15
Reading an Ammeter 15
Charging Time Instructions 16
Engine Starting 19

Maintenance

Maintenance 20

Troubleshooting

Troubleshooting 21

Limited Warranty

Limited Warranty 21

INTRODUCTION

Description

This battery charger is designed to handle the majority of your charging and starting needs.

- Multiple Charge Rates for various battery sizes.
- High-Amperage Engine Start to help start vehicles when the battery is too weak to do the job alone.
- An Ammeter to monitor charging progress.
- A Timer Switch to set the desired charge time.
- Large Saw-Tooth Clamps assure good connection to top or side-mount battery terminals.
- Wheel and Handle Kit for easy moving around your shop.
- Heavy-Duty Christie-Tough™ construction for long, trouble-free life.

How Batteries Charge

A charger does not force current into a battery – it makes a limited amount of current available and the battery draws as much of it as it needs, up to or slightly greater than the rated output current capability of the charger.

The closer a battery is to zero capacity (dead battery), the more charging current it will want to draw. When charging begins on a dead battery, the charger's ammeter will register toward the high end of the scale and move toward zero as the battery becomes more fully charged. Keep in mind, the ammeter registers the amount of amperage being drawn from the charger by the battery, not what the charger is capable of delivering.

One would expect a battery to draw zero amps when it reaches 100% charge. But at 100% charge, the battery will continue to draw a low level of current and convert it into heat within the battery. If left connected and charging after reaching 100% charge, the battery acid will begin to boil, may produce acid vapor and get hot, resulting in overcharging and possible battery damage.

Note: A slow, intermittent bubbling sound may be heard coming from the battery during the charging process. This is a normal condition and just another indicator the battery is being charged.

To reduce the risk of battery overcharging, it is important to thoroughly read this instruction manual.

Deeply-Discharged Lead-Calcium Batteries

Many newer automotive batteries are of a lead-calcium plate design. When deeply discharged, they may require an activation period before accepting a measurable charge. This activation period may take as long as 4 to 8 hours.

If, at the beginning of the charging process, you notice that the ammeter is at or near zero, but you have determined that the battery is very discharged (less than 25% of charge), this is a good indication that an activation period is required (see Pre-Charge Battery Activation).

Spark Prevention

Make sure no sparks or flames occur near the battery, especially during charging. It takes very little to ignite the explosive gasses produced by a lead-acid battery during the charging process. Read, understand and follow the safety information provided in the Safety Summary section of this manual before attempting to work with or near a lead-acid battery.

For more information about batteries and battery charging, contact Battery Council International at (312) 644-6610, and request their Battery Service Manual, which is available for a nominal charge.

ASSEMBLY

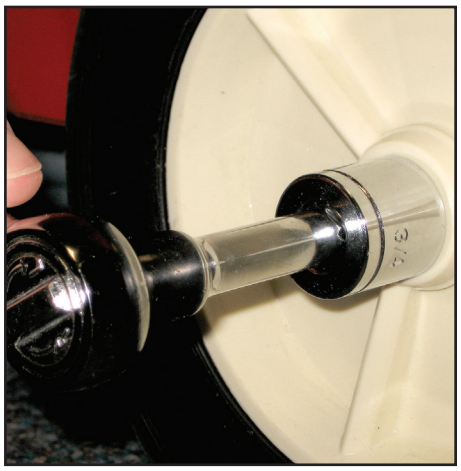
Charger Assembly

1. Carefully remove the charger unit and all associated hardware from carton.

2. Attached handle onto back of cabinet using two (2) 1” bolts.

3. Remove the plywood packing base by remove three (3) sheet metal screws.

4. Thread and tighten one (1) axle cap on the axle and slide on one (1) wheel. Push axle through holes in the side/bottom of cabinet. Slide on other wheel and thread and tighten on other axle cap.



5. Mount the front foot onto bottom of charger base using two (2) 1/2’ bolts.

PREPARATION

Charger Placement

Place the charger in a clean, dry, stable, well-ventilated spot as far from the battery as the DC output cables permit.

NEVER place the charger directly above the battery being charged; gasses from the battery will corrode and damage the charger.

NEVER allow battery acid to drip on the charger when reading specific gravity or filling the battery.

NEVER place a battery on top of the charger.

NEVER attempt to permanently mount this battery charger on a marine or recreational vehicle.

NEVER position the charger on the outside of a boat or recreational vehicle.

Provide Required Power

This battery charger requires a nominal alternating current (ac) power source according to the chart below:

Model No.	AC Power Supply Required
QWC	120V 60Hz
FDC	120V 60Hz
QWC2	230V 50/60Hz
FDC2	230V 50/60Hz

The power source must be fused at an amperage greater than or equal to the input amps rating of this charger.

Do not plug the charger into the AC power source until told to do so in the operating instructions.

WARNING: ELECTRIC SHOCK CAN KILL!
See complete warning on page 3.

To reduce risk of electric shock, never alter AC power cord or power cord plug provided on the charger. If it will not fit the outlet, have a proper outlet installed by a qualified electrician. Never use an adapter.

The charger must be grounded to reduce risk of electric shock. The charger is equipped with an electric cord that has an equipment grounding plug. The plug must be plugged into an AC outlet that is properly installed and grounded in accordance with all local codes and ordinances.

Extension Cords

Note: Engine starting performance may be reduced when extension cords are used.

An extension cord should not be used unless absolutely necessary. If necessary, care must be taken to select an extension cord suitable for use with your specific battery charger (see Shock Hazards in Safety Summary).

WARNING: Fire can kill, injure and cause property damage!
See Safety Summary, pages 2-4.

To reduce risk of electric shock and fire, never alter the AC power cord or power cord plug provided on the charger. Never alter extension cords or extension cord plugs. Make sure the extension cord is properly wired and in good electrical condition. Make sure the wire size (American Wire Gauge or AWG) of the extension cord is large enough to handle your specific charger's amperage requirements.

Battery Preparation

WARNING: Battery explosion can injure and cause property damage! Never smoke or allow a spark or flame in the vicinity of the battery or engine.
See Safety Summary, pages 2-4.

If it is necessary to remove the battery from the vehicle to charge it, make sure all accessories in the vehicle are off and always remove the grounded cable from the battery first.

If needed, add distilled water to each cell of the battery until battery acid reaches the manufacturer's specified level. **DO NOT OVERFILL!** This helps remove excessive explosive gasses from the battery. For maintenance free batteries without caps, carefully follow the battery manufacturer's recharging instructions.

WARNING: Battery acid can cause serious injury and property damage!
See Safety Summary, pages 2-4.

Always wear complete eye and clothing protection and avoid touching eyes while working near battery.

Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.

Study all of the battery manufacturer's precautions, such as whether cell caps should be left in place or removed during charging, and the recommended rates of charge for the specific battery. If you are unable to determine the battery manufacturer's requirements for charging, always charge the battery with cell caps in place.

If the battery voltage cannot be determined from the information on the battery itself, refer to the owner's manual for the product in which the battery was installed.

CONTROLS AND INDICATORS

Charge Rate Selector switch is a multiposition rotary switch. This switch is used to set both the charging voltage and rate of charge (hi/med/lo).

Charging Indicator LED is a status light. This LED will light whenever the charger is charging.

Timer Switch allows the selection of any charging time, up to 120 minutes. When the selected time is up, the timer automatically shuts the charger OFF. This switch also has a hold position, which will keep the charger ON until turned OFF. See Timer Switch Setting in this section for more details.

Ammeter indicates the charging current being drawn from the charger by the battery. See Reading an Ammeter in this manual.

Polarity Protection Switch is a bi-position switch. This switch is used to engage or disengage the automatic reverse polarity protection feature on this charger.

Control Setting Instructions

Charge Voltage and Rate Selection

Set the Rate Selector to the voltage and charge rate that is appropriate for the size and type of battery being charged. Use the battery manufacturer's specific instructions or see the guidelines below. If the battery voltage is not clearly marked on the battery, refer to the operator's manual for the vehicle/equipment where the battery is used/ intended to be used. Do not begin charging if the battery voltage cannot be determined.

Deep-cycle	20 Amps or less
Maintenance-free Automotive or Marine Cranking	45 Amps or less
Heavy-duty Commercial	80 Amps or less

Charging Rate Settings by Model

Model No.	6V Lo	6V Med	6V Hi	12V Lo	12V Med	12V Hi	24V Lo	24V Med	24V Hi
QWC	20A	30A	40A	10A	40A	70A	—	—	—
FDC	—	40A	60A	—	40A	70A	10A	20A	40A

Charging Indicator LED

This LED will light whenever the charger is in active charging mode. In addition, the internal cooling fan should start whenever the unit is charging. (NEVER operate the charger if the fan is not running while the Charging Indicator LED is lit.)

Timer Switch Setting

Set the timer for the length of charging time required to bring the battery to full charge, as determined in Charging Time Instructions. When selecting times less than 20 minutes, turn timer past the 20-minute mark, then back to the time desired. Setting the time to charge starts the charging process. To prevent overcharging, do not set the timer for more time than it will take to bring the battery to full charge. If the timer is turned to the left, past OFF, HOLD is selected. In this position, the charger will remain ON indefinitely. This position should be used only when charging at a low rate for extended periods. The battery can be damaged when being charged for extended periods, especially at higher amperages.

Polarity Protection Switch

The charger is equipped with automatic polarity protection and will not charge if the charging clamps are improperly connected to a battery (reversing positive and vehicle ground). This feature is designed to prevent damage to vehicle electronics due to an improper connection. The protection circuit is electronic and extremely sensitive. However, if the battery to be charged is too discharged (below 1.5 Volts) to energize the polarity protection circuit, charging current will not flow (as indicated on the Ammeter).

If the charging light is ON but current does not flow, the clamp connections may be reversed or a poor contact has been made to the battery. Turn the charger OFF and disconnect the ac power supply. Check all vehicle connections (See Connecting to Batteries Installed in a Vehicle). If all vehicle connections are correct and there is good contact at the battery connection, reconnect ac power supply and restart the charging process. If the charger still does not charge (and the Charging Indicator LED is lit), press the Polarity Bypass Switch and release. This switch provides a slight charge to the battery so that the automatic polarity protection circuit can correctly identify the positive terminal and permit the charger to begin charging. If there is still no charging current, the battery is probably defective or sulfated and cannot be charged.

Pre-Charge Battery Activation

Some modern batteries can cause charging problems if they have been deeply discharged. The plates in such batteries can begin sulfating quickly, forming a barrier to accepting a charge. This condition will be indicated by an extremely low (or zero) ammeter reading. A deeply discharged battery such as this may take as long as 4 to 8 hours before it will accept a charge. When charging a battery with this condition, set the Rate Selector for a moderate charge rate and check on the battery every 30 minutes. When the sulfate barrier has been broken through, the battery will begin accepting a charge and the ammeter will register a higher, normal charging rate. The amount of time to charge the battery fully (determined in Charging Time Instructions) begins when the battery begins accepting a charge. If necessary, reset the timer to the length of charging time required, after the battery begins accepting a charge.

OPERATION

Operating Instructions

ATTENTION: Do not attempt to operate this battery charger until you have read and understood the entire Safety Summary provided in this manual.

Note: Go to Assembly in this manual before proceeding with the operation of your battery charger. Do not attempt to operate the charger until all required user-assembly is completed.

WARNING: Connect and disconnect DC output clamps only after setting any charger switches to the "OFF" position and removing AC cord from electric outlet. Never allow clamps to touch each other.

Connecting to Batteries Installed in Vehicles

1. Make sure that the AC power cord is unplugged from the AC outlet and make sure the vehicle's engine is turned off.
2. Position the AC power cord and DC output cables in such a manner that they cannot be damaged by moving engine parts or the vehicle's hood or doors.
3. Check the polarity of the battery terminals. The POSITIVE terminal should be marked POSITIVE, POS, + or P. The NEGATIVE terminal should be marked NEGATIVE, NEG, – or N.
4. Determine whether the vehicle has a positive or negative grounded battery (positive or negative cable is connected to the vehicle's chassis).

   WARNING: Moving engine parts can cause serious injury! Stay clear of fan blades, belts, pulleys and other moving engine parts to reduce risk of serious personal injury.

   a. Negative Ground Vehicles (most common, see Figure 5)

      1) Connect the POS (red, +) clamp from the battery charger to the POS, ungrounded terminal of the battery.

      2) Connect the NEG (black, –) clamp from the battery charger to a heavy gauge metal part of the vehicle chassis or engine block away from the battery. DO NOT connect the NEG charger clamp to the NEG battery terminal, carburetor, fuel lines or sheet metal body parts.

   b. Positive Ground Vehicles

      1) Connect the NEG (black) charger clamp to the NEG, ungrounded terminal of the battery.

      2) Connect the POS (red) charger clamp to a heavy gauge metal part of the vehicle chassis or engine block away from the battery. DO NOT connect the POS (red) charger clamp to the POS battery terminal, carburetor, fuel lines or sheet metal body parts.

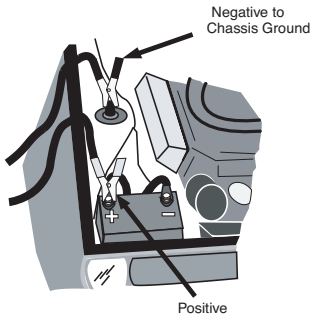


Figure 5. Negative Ground Vehicle

Connecting to Batteries Outside a Vehicle

1. Make sure that the AC power cord is unplugged from the AC outlet.
2. Check the polarity of the battery terminals (see Figure 6). The POSITIVE terminal should be marked POSITIVE, POS, + or P. The NEGATIVE terminal should be marked NEGATIVE, NEG, – or N.
3. Attach a battery or booster cable, AT LEAST 24 inches long, that is the same (or larger) wire gauge as the charger cable, to the NEGATIVE terminal of the battery.

   WARNING: Battery explosion can injure, and cause property damage! To reduce the risk of battery explosion, NEVER connect both battery charger clamps directly to the two posts of a battery.

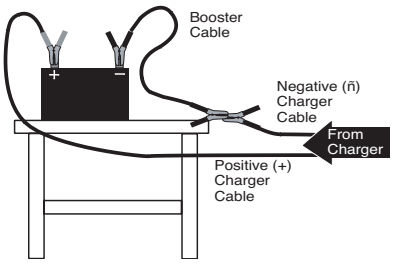


Figure 6. Connecting Outside a Vehicle

4. Connect the POS (red) charger clamp to the POS battery terminal.
5. Position yourself and the free end of the cable (attached to the NEG battery terminal) as far away from the battery as the cable will allow. Then, WHILE FACING AWAY FROM THE BATTERY, connect the NEGATIVE charger clamp to the free end of the cable.

Charging Instructions

Note: A marine (boat) battery must be removed and charged on shore. To charge it on board requires equipment specially designed for marine use.

1. Determine the length of time necessary to charge the battery in Charging Time Instructions, but do not start the timer.
2. Set all switches and the timer to OFF and connect the charger power cord into an appropriate AC outlet.
3. Set charging voltage, charging rate and any other functions according to Control Setting Instructions.
4. On models so equipped, set the Timer for the desired length of charge time.

   WARNING: Battery explosion can injure, and cause property damage! To reduce risk of battery explosion, do not overcharge a lead-acid battery. Follow disconnection procedure exactly.
5. When charging is complete, turn all charger controls to OFF. Then unplug the charger's AC power cord from the AC power source.
6. Disconnect the charger clamp NOT attached directly to the battery first and DO NOT allow the clamp to touch anything. Then, disconnect the charger clamp attached to the battery terminal.

Reading an Ammeter

The ammeter indicates the charging current being drawn from the charger by the battery. As the battery becomes more fully charged, the charge rate lessens and the ammeter needle moves toward the lower range on the meter. During engine starting, the ammeter will usually peg to the high-amperage end of the meter.

There is no clear-cut way to read an ammeter and determine exactly when charging is complete. At full charge, the ammeter will still register some current draw (approximately 50% of the charger's output rating). In many cases, overcharging can occur if the charger is not disconnected when the battery reaches full charge – or sooner. Therefore, it is very important that you follow the Charging Time Instructions provided in this manual.

Several battery conditions can also cause the ammeter to appear to indicate a battery near full charge, when in fact, charging has only begun:

Cold Batteries (temperatures lower than 32°F or 0°C) will begin charging at a low rate of charge. But, as the battery warms up through charging, the charge rate will increase. Then, as the battery charges up, the charge rate will decrease normally.

WARNING: Battery explosion can injure, and cause property damage! To reduce the risk of battery explosion, check to make sure a cold battery is not frozen. Battery explosion can result from attempting to charge a frozen battery.

Sulfated or Deeply-Discharged Lead-Calcium Batteries require a special activation procedure. See Pre-Charge Battery Activation, page 13.

Shorted Batteries When the battery being charged has a short circuit, the ammeter will peg at the high-amp end of the scale. If, after 5 to 10 minutes of charging, the needle has not started to move toward lower amperages, unplug the charger and discontinue charging.

If available, use a voltmeter and read the battery voltage. If the voltage is less than 12.0 Volts for a 12 Volt battery or less than 6.0 Volts for a 6 Volt battery, plug the charger back in and resume charging. If, after another 15 to 20 minutes, the ammeter has failed to move toward lower amperages, repeat the voltmeter test. If the voltage has not increased, the battery needs to be serviced or replaced.

CAUTION: Do not use an ammeter to determine when full charge is reached. Failure to comply with this caution could cause the battery to be damaged from overcharging. The battery could overheat and even explode.

Charging Time Instructions

Manual battery chargers need to be disconnected from a battery when the battery has reached 100% of charge or sooner. If this is not done, the battery will overcharge, resulting in possible battery damage.

The following instructions or the associated Length of Charge Time Charts (60 amps down to 2 amps, one for each charging range) will allow you to determine how long it will take to bring a specific battery to full charge.

CAUTION: Batteries that have 25% charge or less can easily freeze and should be charged at once, but do not charge a battery that is already frozen.

1. Determine the present level of charge in the battery with a hydrometer or electronic percent-of-charge tester.
2. Determine the size of the battery in Amp-Hours or Reserve Capacity. If these ratings are not printed on the battery, contact your local battery dealer for this information. These are the only ratings that can be used to determine length of charging time. Then either use the formula in step 3 or use Table 2 plus Table 3 through Table 9 for the charging rate capabilities of this charger.
3. Use the battery rating, the charge level of the battery, and the amp setting to be used on the charger (see Table 2) in the formula provided below.

$$\left(\frac{\text{Amp Hour Rating of Battery} \times \text{Percent of Charge NEEDED}}{\text{Amp Setting Selected On Charger}} \right) \times 1.25 = \text{Hours to Charge}$$

Example:

Battery's Present State of Charge: 25%

Percent of Charge Needed: 100% - 25% = 75%, Decimal = .75

Amp Setting on Charger: 10

$$\frac{60 \times .75}{10} \times 1.25 = \text{Hours to Reach Full Charge}$$

$$\frac{45}{10} \times 1.25 = \text{Hours to Reach Full Charge}$$

$$4.5 \times 1.25 = \text{Hours to Reach Full Charge}$$

$$\frac{\text{Reserve Capacity}}{2} + 15.5 = \text{Amp-Hour Rating}$$

Amp-Hour Rating of Battery: 60

Note: If the battery is rated in Reserve Capacity, use the following formula to convert reserve capacity to amp-hours.

Length of Charge Time Chart 70 Amps

BATTERY RATINGS				MINUTES TO CHARGE @ 70 AMPS for the percent-of-charge now in the battery				
Approx. Marine Cranking Amps	Approx. Cold Cranking Amps	Ampere Hours	Reserve Capacity (Minutes)	0%	25%	50%	75%	100%
	750	66	100	71	53	35	18	0.0
600		61	90	65	49	33	16	0.0
	550	56	80	60	45	30	15	0.0
500		51	70	55	41	29	14	0.0
	400	46	60	49	37	25	12	0.0
400		41	50	44	33	22	11	0.0
	300	36	40	39	29	19	10	0.0
300		31	30	33	25	17	8	0.0
	200	26	20	28	21	14	7	0.0

Length of Charge Time Chart 60 Amps

BATTERY RATINGS				MINUTES TO CHARGE @ 60 AMPS for the percent-of-charge now in the battery				
Approx. Marine Cranking Amps	Approx. Cold Cranking Amps	Ampere Hours	Reserve Capacity (Minutes)	0%	25%	50%	75%	100%
	750	66	100	83	62	41	21	0.0
600		61	90	76	57	38	19	0.0
	550	56	80	70	53	35	18	0.0
500		51	70	64	48	32	16	0.0
	400	46	60	58	43	29	14	0.0
400		41	50	51	38	26	13	0.0
	300	36	40	45	34	23	11	0.0
300		31	30	39	29	19	10	0.0
	200	26	20	33	24	16	8	0.0

Length of Charge Time Chart 40 Amps

BATTERY RATINGS				MINUTES TO CHARGE @ 40 AMPS for the percent-of-charge now in the battery				
Approx. Marine Cranking Amps	Approx. Cold Cranking Amps	Ampere Hours	Reserve Capacity (Minutes)	0%	25%	50%	75%	100%
	750	66	100	124	93	62	31	0.0
600		61	90	114	86	57	29	0.0
	550	56	80	105	79	53	26	0.0
500		51	70	96	72	48	24	0.0
	400	46	60	86	65	43	22	0.0
400		41	50	77	58	38	19	0.0
	300	36	40	68	51	34	17	0.0
300		31	30	58	44	29	15	0.0
	200	26	20	49	37	24	12	0.0

Length of Charge Time Chart 30 Amps

BATTERY RATINGS				MINUTES TO CHARGE @ 30 AMPS for the percent-of-charge now in the battery				
Approx. Marine Cranking Amps	Approx. Cold Cranking Amps	Ampere Hours	Reserve Capacity (Minutes)	0%	25%	50%	75%	100%
	750	66	100	165	124	83	41	0.0
600		61	90	153	114	76	38	0.0
	550	56	80	140	105	70	35	0.0
500		51	70	128	96	64	32	0.0
	400	46	60	115	86	58	29	0.0
400		41	50	103	77	51	26	0.0
	300	36	40	90	68	45	23	0.0
300		31	30	78	58	39	19	0.0
	200	26	20	65	49	33	16	0.0

Length of Charge Time Chart 20 Amps

BATTERY RATINGS				MINUTES TO CHARGE @ 20 AMPS for the percent-of-charge now in the battery				
Approx. Marine Cranking Amps	Approx. Cold Cranking Amps	Ampere Hours	Reserve Capacity (Minutes)	0%	25%	50%	75%	100%
	750	66	100	248	186	124	62	0.0
600		61	90	229	172	114	57	0.0
	550	56	80	210	158	105	53	0.0
500		51	70	191	143	96	48	0.0
	400	46	60	173	129	86	43	0.0
400		41	50	154	115	77	38	0.0
	300	36	40	135	101	68	34	0.0
300		31	30	116	87	58	29	0.0
	200	26	20	98	73	49	24	0.0
DEEP CYCLE*				HOURS TO CHARGE				
N/A	N/A	135	N/A	8.4	6.3	4.2	2.1	0.0
N/A	N/A	110	N/A	6.9	5.2	3.4	1.7	0.0
N/A	N/A	100	N/A	6.3	4.7	3.1	1.6	0.0
N/A	N/A	90	N/A	5.6	4.2	2.8	1.4	0.0
N/A	N/A	80	N/A	5	3.8	2.5	1.3	0.0

Length of Charge Time Chart 10 Amps

BATTERY RATINGS				MINUTES TO CHARGE @ 10 AMPS for the percent-of-charge now in the battery				
Approx. Marine Cranking Amps	Approx. Cold Cranking Amps	Ampere Hours	Reserve Capacity (Minutes)	0%	25%	50%	75%	100%
	750	66	100	495	371	248	124	0.0
600		61	90	458	343	229	114	0.0
	550	56	80	420	315	210	105	0.0
500		51	70	383	287	191	96	0.0
	400	46	60	345	259	173	86	0.0
400		41	50	308	231	154	77	0.0
	300	36	40	270	203	135	68	0.0
300		31	30	233	174	116	58	0.0
	200	26	20	195	146	98	49	0.0
DEEP CYCLE*				HOURS TO CHARGE				
N/A	N/A	135	N/A	16.9	12.7	8.4	4.2	0.0
N/A	N/A	110	N/A	13.8	10.3	6.9	3.4	0.0
N/A	N/A	100	N/A	12.5	9.4	6.3	3.1	0.0
N/A	N/A	90	N/A	11.3	8.4	5.6	2.8	0.0
N/A	N/A	80	N/A	10	7.5	5	2.5	0.0

Note: The length of charge times on these charts are very accurate when using the Reserve Capacity or Ampere Hour battery ratings. The Cold Cranking Amps and Marine Cranking Amps ratings are approximations and vary from battery to battery. Always follow the battery manufacturer's specific charging instructions.

Do not charge deep cycle batteries with a battery charger, or setting on a charger, that has a rating of more than 20 amps. Follow the battery manufacturer's specific charging instructions.

Engine Starting

This battery charger can provide a high-current output to help start a vehicle with a weak battery. However, the onboard computer in some vehicles can be damaged when attempting to jumpstart. **ALWAYS READ THE VEHICLE OPERATOR'S MANUAL BEFORE AUXILIARY STARTING** to determine if jumpstarting can do damage to the vehicle. If not, read and follow these instructions.

CAUTION: Do not attempt to boost start a vehicle that does not contain a battery or you may damage electrical systems in the vehicle.

1. Connect the battery charger to the vehicle according to Operating Instructions.
2. Confirm vehicle voltage and ensure that all settings used during the jump starting process conform to that voltage.
3. Charge the battery for 5 to 10 minutes at the appropriate charge rate for the size of battery.
4. Set the Rate Selector to HI setting for applicable voltage and try to start the vehicle. If the vehicle doesn't start after 3 to 4 seconds, stop and wait 3 to 4 minutes. Repeat until engine starts.

CAUTION: Excessive continuous engine cranking can damage vehicle starter motors.

Note: If the engine spins but fails to start after several starting attempts, there is an engine problem not related to the starting system. Discontinue cranking the engine until the other problem is found and corrected.

This battery charger has an internal thermal protector to prevent overheating and damage to the battery charger. If, after repeated starting attempts, the ammeter registers zero output, wait 3 to 4 minutes for the charger to cool. The thermal protector will automatically reset and allow you to continue.

MAINTENANCE

CAUTION: Make sure charger is unplugged from AC outlet before performing any cleaning or maintenance.

A minimum amount of care can keep your battery charger working and looking good for years.

1. Clean the clamps after each use. Wipe off any battery fluid that may have come in contact with the clamps to prevent corrosion. Battery fluid may be neutralized with a solution of water and baking soda.
2. Coil the input and output cables neatly after each use. This will help prevent damage to the cables and the charger.
3. If needed, the case may be wiped clean with a soft cloth.

TROUBLESHOOTING

No ammeter reading (battery does not accept charge).

1. Make sure charger is plugged into live AC outlet.
2. After unplugging unit, check connection at battery. Make sure the clamps are making good contact with the battery terminal (or vehicle chassis).
3. Check to see that the battery is capable of being charged – it may be damaged or sulfated. See Polarity Protection Switch in **Controls and Indicators** section.
4. Make sure that you have selected the proper charge voltage for the battery being charged.
5. Make sure you are allowing enough time for charging the battery. Refer to the charging time formulas earlier in this manual.

Ammeter shows reading, but battery does not accept charge.

1. Check to see that the battery is capable of being charged – it may be damaged or sulfated. See Polarity Protection Switch in Controls and Indicators section.
2. Make sure you are allowing enough time for charging the battery. Refer to the charging time formulas earlier in this manual.

Vehicle will not start in engine start mode.

1. Unplug charger and check connections as described above.
2. Determine if charger is charging; if meter indicates any amperage, charger is working; if no amperage is indicated, wait several minutes and recheck. Charger thermal protector may have tripped.
3. If engine turns over but does not start, problem is with vehicle, not charger. Service vehicle.

See Limited Warranty for further information on obtaining service.

LIMITED WARRANTY

Clore Automotive, L.L.C. warrants that for the periods outlined in the table below from the date of original retail purchase of the entire unit, it will repair, at no charge for parts and labor as noted, this product if proven defective in material or workmanship. If, after reasonable efforts by Clore Automotive, the product is deemed not repairable, Clore Automotive will, at it's option, refund the original purchase price or supply a replacement unit.

Model No.	Transformer/Rectifier Warranty Period	All Other Parts* Warranty Period	FREE Service Labor Warranty Period
QWC	5 Years	2 Years	1 Year
FDC	10 Years	5 Years	1 Year

*Excludes cables and clamps.

THE TERMS OF THE CLORE AUTOMOTIVE LIMITED WARRANTY CONSTITUTE THE BUYER'S SOLE AND EXCLUSIVE REMEDY. THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED IN DURATION TO THIS EXPRESS WARRANTY. AFTER THE WARRANTY PERIOD, ALL RISK OF LOSS FROM WHATEVER REASON SHALL BE PUT UPON THE PURCHASER.

CLORE AUTOMOTIVE SHALL NOT BE LIABLE FOR INCIDENTAL AND CONSEQUENTIAL DAMAGES UNDER ANY CIRCUMSTANCES: LIABILITY, IF ANY, SHALL NEVER EXCEED THE PURCHASE PRICE OF THIS MACHINE REGARDLESS OF WHETHER LIABILITY IS PREDICATED UPON BREACH OF WARRANTY (EXPRESS OR IMPLIED), NEGLIGENCE, STRICT TORT OR ANY OTHER THEORY.

This warranty extends to each person who acquires lawful ownership within the warranty period, but is void if the product has, in Clore Automotive's sole judgement, been abused, altered, misused or improperly packaged and damaged when returned for repair.

This warranty applies to the product only and does not apply to any accessory items included with the product, which are subject to wear from usage; the replacement or repair of these items shall be at the expense of the owner.

Some states do not permit the limitation of warranties or limitation of consequential or incidental damages, so the above disclaimer and limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

TO OBTAIN SERVICE UNDER THIS WARRANTY:

Bring or send to the nearest Clore Automotive Authorized Warranty Service Center along with a copy of your purchase receipt, or call Technical Service at (800) 328-2921. To locate the nearest Clore Automotive Authorized Warranty Service Center, go to www.cloreautomotive.com.

If this product fails within the first 30 days after retail purchase due to a defect in material or workmanship, return it to your place of purchase for an exchange. A valid, dated sales receipt is required to obtain service under this warranty.

Registering Your Purchase:

For best service and to receive periodic product updates, follow the instructions below to register your purchase:

Please visit: www.cloreregistration.com
Click on the Christie logo
Complete the information in the web form and click "submit"
It's that easy!

For answers to questions concerning use, out-of-warranty service, or warranty/service information on this or other Clore Automotive products, contact:

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